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BY NA
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3 1 2 3 Groundwater Investigation

In order to more completely evaluate the presence and quality of groundwater at and downgradient of the Original Landfill, additional groundwater samples need to be collected and analyzed. Since the presence and quantity of groundwater appears to be limited, this task shall consist of three work elements:

- 1) install and develop up to 9 piezometers, 5 mini-wells, and 6 bedrock (LHSU) monitoring wells (Figure 3 1 2 2-1),
- 2) measure water levels in all well points, mini-wells, piezometers, and monitoring wells that are along or north of Woman Creek, south of the south Buffer-Zone access road, east of the western edge of IHSS 115 (approximately CPT07393), and west of the eastern edge of IHSS 115 (approximately CPT05393) on a monthly basis for one year, and
- 3) **obtain up to two groundwater samples, through the second quarter of calendar year 1995, from any location that is in, adjacent to, or downgradient of the landfill if water measurements indicate the presence of a sufficient quantity of water**

The purpose of installing the nine piezometers and five mini-wells is to further characterize the present or absence of groundwater. The nine piezometers to be installed will be constructed in the geotechnical boreholes (see Section 3 1 2 2) where groundwater is encountered. The five proposed mini-well locations are placed in 1) bedrock lows that were identified during the CPT investigation (but water was not detected), and 2) between existing well points. Of the five mini-wells to be installed, four shall be installed downgradient of IHSS 115 and one shall be installed on the upper level part of the eastern end of IHSS 115 in the vicinity of borehole 50792. This latter location will be used for only water level input for the hydrogeologic model and not sampling. These mini-wells will be installed using a small all-terrain vehicle rig which does not produce soil cuttings. Composite soil samples will be collected during drilling in accordance with the procedures outlined in TM7 (EG&G, 1993e). In addition, discrete samples

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from the unweathered bedrock will be handled in accordance with SOP FO 23, Management of Soil and Sediment Investigative Derived Materials (IDM), for removal to the landfill

The ~~six~~ bedrock monitoring wells will be developed in accordance with SOP GW 2, Well Development. The bedrock wells will be sampled on a quarterly basis for OU5 target analytes (Table 3 1 2-1) for ~~six months~~ in accordance with GW 6, Groundwater Sampling. If sufficient groundwater is encountered, the deep bedrock monitoring wells may have aquifer tests performed, either slug (GW 4) or pumping (GW 8) tests. Water levels will be collected monthly for one year after development.

Water levels will be measured in all the monitoring wells, well points, and piezometers located along or north of Woman Creek, south of West Road, east of the western Buffer-Zone boundary road, and west of First Street. This includes the piezometers along Woman Creek as discussed in a subsequent paragraph. Water level measurements will continue monthly for a year. This will characterize the magnitude of seasonal fluctuations and provide the hydrogeologic model an average level.

Groundwater samples shall be obtained from any well, piezometer, well point, or mini-well that is in, adjacent to, or down gradient of the Original Landfill (existing or new) if water level measurements indicate the presence of a sufficient quantity of water. These samples will be collected quarterly for six months.

Groundwater samples will be collected in the priority listed on Table 3 1 2 3-1. Information from these work elements will be used for the evaluation of nature and extent, as well as input for the hydrogeologic model.

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Field QC samples will be collected for both soil and groundwater samples. Duplicate samples will be collected with the frequency of one duplicate sample per 10 real samples. Rinsate samples will be collected with the frequency of one rinsate sample per 20 real samples.

Because groundwater sampling equipment is dedicated, the instrument probes used to measure field parameters will be rinsed to obtain the groundwater rinsate samples. One VOC trip blank will be prepared and will accompany each groundwater sampling crew per cooler per day.

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Table 3 1 2-1 Summary of Amended Field Sampling Plan
 IISS 115 (Original Landfill) and IISS 196 (Filter Backwash Pond)
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EVALUATION	ACTIVITY	NO OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TFRF
GEOTECHNICAL EVALUATION (CONT)	Evaluate Subsurface geometry/geotechnical properties (cont)		Soil samples of shear zone/weathered bedrock	Selected samples	8 ICU (ASTM D4767 88) 2 Consolidation (ASTM D2435 90) 10 Alterberg Limits (ASTM D4318 93) 5 Gradation (ASTM D1140 92)	3 1 2 2
			Soil samples of unweathered bedrock	Selected samples	3 Drained Direct Shear (ASTM D3080 90)	
		9 piezometers (IISS borehole advanced as discussed on preceding page)	monthly	water level	replicate measurements as specified in SOP GW 01	
			quarterly for two quarters	TCI VOCs, SVOCs, IAI Metals and Radionuclides	1 dup/10 samples, 1 rinse/20 samples or minimum of 1 rinse/day and associated trip blank	
Groundwater Investigation	Waste and core characterization	20 IISS boreholes and 6 deep bedrock monitoring wells	1 drum composite per 4 drums (approx 1 drum per 10 ft of borehole)	TCI VOCs, SVOCs, Pest & PCBs TAL Metals, and Radionuclides	1 dup/10 samples, 1 rinse/20 samples or minimum of 1 rinse/day and associated trip blank	3 1 2 3
	Back calculate strength parameters and calculate long term stability by method of slices	NA	NA	NA	NA	
	Install and sample mini wells	5	2 foot discrete soil samples	TCI VOCs	1 dup/10 samples, 1 rinse/20 samples or minimum of 1 rinse/day and 1 trip blank per field crew per day per order	
			6 foot composite soil samples or alternative composites as specified in TM7	SVOCs, Pesticides & PCBs IAI Metals and Radionuclides		

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Table 3 1 2-1 Summary of Amended Field Sampling Plan
 IISS 115 (Original Landfill) and IISS 196 (Filter Backwash Pond)
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FUNCTION	ACTIVITY	NO. OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TEXT
Groundwater Investigation	Install and sample mini wells (cont.)		Groundwater quarterly for two quarters	TCL VOCs SVOCs TAL Metals and Radionuclides	1 dup/10 samples, 1 rinse/20 samples and 1 trip blank per field crew per day per cooler	3 1 2 3
	Measure water levels	46	monthly	water level	replicate measurements as specified in SOP GW 01	
	Sample existing well points	TBD	quarterly for two quarters	TCL VOCs SVOCs TAL Metals and Radionuclides	1 dup/10 samples, 1 rinse/20 samples and 1 trip blank per crew per day per cooler	
	Characterize bedrock LUISU and install monitoring wells	6	continuous core field screen Groundwater-quarterly for two quarters	TCL VOCs SVOCs TAL Metals and Radionuclides	1 dup/10 samples 1 rinse/20 samples or minimum of 1 rinse/day and 1 trip blank per crew per day per cooler	
	Aquifer tests	1	once	NA	NA	
Storm Sewer Sampling	Collect samples from storm sewer outfall	1	quarterly	TCL VOCs, TAL Metals Radionuclides, and Water Quality Parameters	1 dup/10 samples 1 rinse/20 samples or minimum of 1 rinse/day and associated trip blank, one per crew per day	3 1 2 4
Air Monitoring	RAAMP Monitoring	Monitoring will be conducted as specified in RAAMP documentation				3 1 2 5
	OUS Ambient Air Samplers	3	bi weekly samples composited monthly	Radionuclides	As specified in SOP AP 13	
	Wind Resuspension - Evaluate Applicability of OUS Wind Tunnel Study	TBD	TBD	TBD	TBD	
	OUS Wind Tunnel Study	TBD	TBD	TBD	TBD	
	Evaluation of Gas Volatilization	TBD	TBD	TBD	TBD	
NA = Not Applicable TBD = To Be Determined						

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Table 3 2 2-1 Summary of Amended Field Sampling Plan
IHSS 133 (Ash Pits, Incinerator, and Concrete-wash Pad)

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EVALUATION	ACTIVITY	NO OF SAMPLING LOCATIONS	SAMPLING FREQUENCY	ANALYTICAL PARAMETERS	FIELD QUALITY CONTROL SAMPLES/PROGRAM	APPLICABLE SECTION OF TEXT
Investigation of TDEM Anomalies	Comprehensive field inspection	NA	NA	NA	NA	3 2 2 1
	Soil boreholes	8	6 foot composite samples or alternative composites as specified in TM7	TAL metals and radionuclides	1 duplicate/10 samples and 1 rinse/20 samples or minimum of 1 rinse/day	
	Collection of geotechnical samples	TBD	10 percent of total number of composite samples	grain size distribution (+200 fraction)	NA	
	Collection of groundwater samples from soil boreholes	TBD (1/location with water)	once	TAL metals and radionuclides	1 duplicate/10 samples (none anticipated) and 1 rinse/20 samples or minimum of 1 rinse/day	
Groundwater Investigation	Advance soil boreholes and install piezometers (mini wells)	9	every third sampler (approx 6 feet)	natural moisture content	NA	3 2 2 2
	Measure water levels	TBD	monthly	water level	replicate measurements as specified in SOP GW 01	
	Sample piezometers	TBD	Quarterly for Two Quarters	TAL metals, SVOCs, and radionuclides	1 duplicate/10 samples (none anticipated) and rinses at the rate of 1 rinse/20 samples or minimum of 1 rinse/day for wells and piezometers or 1 rinse/20 samples for miniwells and well points (rinse probes)	
	Visual survey of Woman Creek stream channel	NA	NA	NA	NA	
Air Monitoring	Aquifer tests	1	once	NA	NA	3 2 2 3
	RAAMP Monitoring	Monitoring will be conducted as specified in RAAMP documentation				
	Special OUS Ambient Air Samplers	3	bi weekly samples composited monthly	Radionuclides	As specified in SOP AP 13	
	Wind Resuspension	TBD	TBD	TBD	TBD	
NA = Not Applicable TBD = To Be Determined						

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